

Appl. No. 10/622,843; Filed July 18, 2003
Amendment Dated December 13, 2005
Reply to Office Action of September 15, 2005

Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Amended) A method of making a fluorinated precursor of a superconducting ceramic, said method comprises:

- a) providing a solution comprising a rare earth salt, an alkaline earth metal salt and a copper salt;
- b) spraying said solution onto a substrate to provide a precursor-covered film-covered substrate; and
- c) heating said precursor-covered film-covered substrate in an atmosphere containing fluorinated gas to provide said fluorinated precursor.

2. (Original) A method according to Claim 1 wherein said solution has a pH in the range of approximately 1 to 5.

3. (Original) A method according to Claim 1 further comprising dispersing said solution in a carrier gas before spraying said solution on said substrate, wherein said carrier gas comprises an inert gas.

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4. (Original) A method according to Claim 3 wherein said inert gas is selected from the group consisting of nitrogen, argon, helium and mixtures thereof.

5. (Original) A method according to Claim 3 wherein said carrier gas further comprises oxygen.

6. (Original) A method according to Claim 1 further comprising heating said substrate before spraying said solution on said substrate.

7. (Original) A method according to Claim 1 wherein said rare earth salt is selected from the group consisting of a yttrium (Y) salt, a neodymium (Nd) salt, a, a ytterbium (Yb) salt, an europium (Eu) salt, a gadolinium (Gd) salt, a dysprosium (Dy) salt, a holmium (Ho) salt, an erbium (Er) salt, a lanthanum (La) salt, a lutetium (Lu) salt, a samarium (Sm) salt, a thulium (Tm) salt, and mixtures thereof.

8. (Original) A method according to Claim 6 wherein said rare earth salt is a yttrium (Y) salt.

9. (Original) A method according to Claim 7 wherein said rare earth salt is selected from the group consisting of a rare earth nitrate, a rare earth acetate and mixtures thereof.

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10. (Original) A method according to Claim 7 wherein said rare earth salt is selected from the group consisting of a rare earth sulfate, a rare earth chloride, a rare earth bicarbonate and mixtures thereof.

11. (Amended) A method according to Claim 1 wherein said salt of an alkaline earth metal is selected from the group consisting of a magnesium (Mg) salt, a calcium (Ca) salt, a strontium (Sr) salt and a barium (Ba) salt and mixtures thereof.

12. (Original) A method according to Claim 11 wherein said salt of an alkaline earth metal is a barium (Ba) salt.

13. (Original) A method according to Claim 12 wherein said barium (Ba) salt is selected from the group consisting of a barium nitrate, a barium acetate and mixtures thereof.

14. (Original) A method according to Claim 12 wherein said barium salt is selected from the group consisting of a barium sulfate, a barium chloride and mixtures thereof.

15. (Original) A method according to Claim 1 wherein said copper salt is selected from the group consisting of a copper nitrate, a copper acetate and mixtures thereof.

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16. (Original) A method according to Claim 1 wherein said copper salt is selected from the group consisting of a copper sulfate, a copper sulfide, a copper chloride and mixtures thereof.

17. (Original) A method according to Claim 1 wherein said substrate is selected from the group consisting of a single crystalline ceramic, polycrystalline ceramic, a single crystal and a metal.

18. (Original) A method according to Claim 17 wherein said substrate is selected from the group consisting of SrTiO₃, LaAlO₃, zirconia, CeO₂, Y₂O₃, MgO, and SrRuO₃.

19. (Original) A method according to Claim 17 further comprising placing a buffer layer on said metal substrate before spraying said solution.

20. (Original) A method according to Claim 1 wherein said fluorinated gas is selected from the group consisting of CHF₃, CH₂F₂, CH₃F, CHF₂CHF₂ (HFC 134), CHF₂CF₃ (HFC 125), CHF₂CH₃ (HFC 152a), CF₃CH₂F (HFC 134a), CH₃CF₃, CH₂FCH₃, CHF₂CH₂F, CH₂FCH₂F, CF₃CH₂CF₃ (HFC 236fa), a fluorinated propane, a fluorinated propylene, a fluorinated ethylene and mixtures thereof.

21. (Original) A method according to Claim 1 wherein said fluorinated gas comprises CF₃CH₂F (HFC 134a).

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22. (Original) A method according to Claim 1 wherein said solution comprises Y, Ba and Cu in a ratio of 1:2:0.5.

23. (Original) A method according to Claim 1 further comprising subjecting said solution to a high voltage Corona discharge before or during the spraying of said solution on said substrate.

24. (Original) A method according to Claim 23 wherein said solution comprises Y, Ba and Cu in a ratio of 1:2:3.5.

25. (Original) A method according to Claim 1 where said atmosphere containing fluorinated gas is subject to a high voltage electrical discharge.

26. (Original) A method according to Claim 1 further comprising transforming the fluorinated precursor into a crystalline superconducting ceramic.

Claims 27-56 (Cancelled).

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57. (Original) A method of inhibiting the conversion of a fluorinated precursor film into a crystalline film, wherein the film comprises rare earth metal, alkaline earth metal cuprate, said method comprising adding a small amount of fluorinated gas during a heat treatment process by which a precursor film is to be converted into a crystalline film.

58. (Original) A method according to Claim 57 wherein the fluorinated gas is added at a pressure of approximately 10 milliTorr or greater during said heat treatment process.